

BOLL MATURITY DATES FOR LATE SEASON COTTON FLOWERS

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Decisions pertaining to crop termination and late season pesticide applications are best made with an understanding of the maturity status of late season cotton bolls. Research conducted by Silvertooth et al. (1996) has shown that the standard Arizona cotton heat unit (HU) system (Brown, 1989) can be used to predict boll maturity (hard, green boll; fiber elongation completed) and boll opening. This work indicates 600 HUs are required after flowering for a boll to reach physiological maturity, and an additional 400 HUs are required for the mature boll to open (Figure 1).

A translation of these HU requirements to calendar dates may prove useful to growers making decisions regarding crop termination or production of a top crop. The table below provides this translation by presenting expected boll maturity and boll opening dates at selected locations for seven possible late season flower dates. Long-term normal values of HU accumulation obtained from local weather stations operated by the Arizona Meteorological Network (AZMET; <http://ag.arizona.edu/azmet>) were used to develop these dates.

Boll maturity dates are especially important since adequate water and pest control must be provided until boll maturity. For example, the boll maturity date for a 9 September flower in Coolidge is 8 October. The growers in this example would need to provide water and pest control through this date to make these bolls. The importance of boll opening dates to a timely and efficient harvest is obvious. The aforementioned 9 September flower in Coolidge would typically open about 8 November. The grower could therefore plan for a final picking date in early to mid-November. Boll opening dates may also be important in higher elevation areas where early hard freezes can result in premature crop termination. Immature, late season bolls may “sour” after a hard freeze, resulting in loss of yield and lint quality.

One final point – precipitation probabilities – should be discussed as we conclude this discussion of late season boll development. Arizona weather records indicate that rainfall probabilities decline rapidly from early September through mid-October with the demise of the summer monsoon. However, by early November the probabilities begin to rise and continue to increase until well after the first of the year (Fig. 2). Late season rains can be particularly troublesome as evaporation at this time of year is low and soils are slow to dry. While the present long range forecast for the fall shows a bias towards above normal temperatures and below normal precipitation (Fig. 3), it is important to note that the La Niña pattern that was responsible for last winter’s very dry weather has dissipated. The El Niño Southern Oscillation (ENSO), the ocean and atmospheric circulation pattern in the tropical Pacific Ocean that produces both El Niño and La Niña events, is now in a neutral condition. The accuracy of winter precipitation forecasts are far less reliable when ENSO is in the neutral phase, but there is a good chance precipitation totals will be higher this winter.

References

Brown, P.W. 1989. Heat Units. Ext. Rpt. #8915. Univ. of Arizona, Tucson, AZ. 12 p.

Silvertooth, J.C., E.R. Norton and P.W. Brown. 1996. Cotton Growth and Development Patterns. Cotton: A College of Agriculture Report. Series P-103. Univ. of Arizona, Tucson, AZ. p. 75-97.

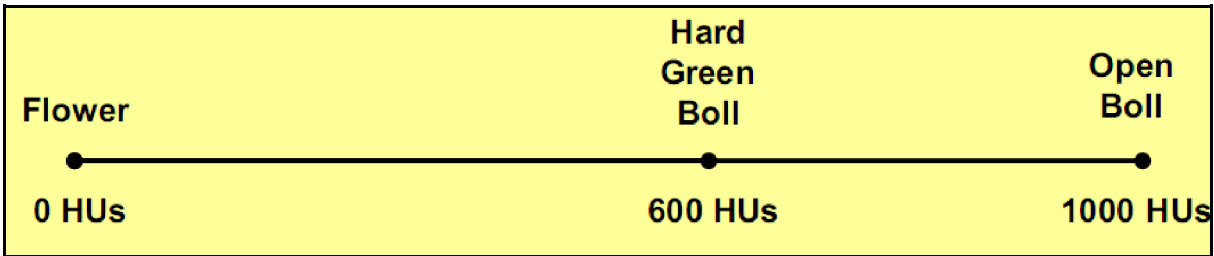


Figure 1. Boll development can be predicted using heat units (HUs). Approximately 600 HUs are required for a boll to reach physiological maturity (Hard Green Boll). An additional 400 HUs are required for the mature boll to open.

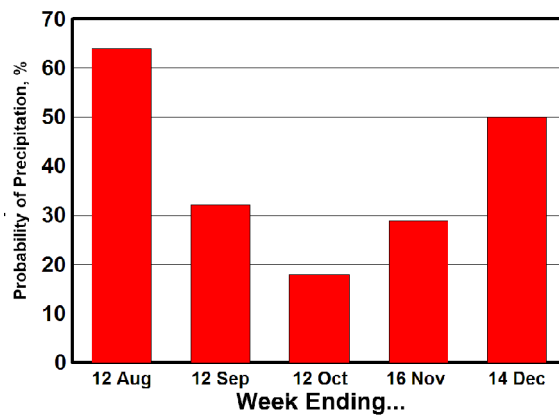


Figure 2. Probability of precipitation for selected weeks at the AZMET weather station located near Coolidge, AZ.

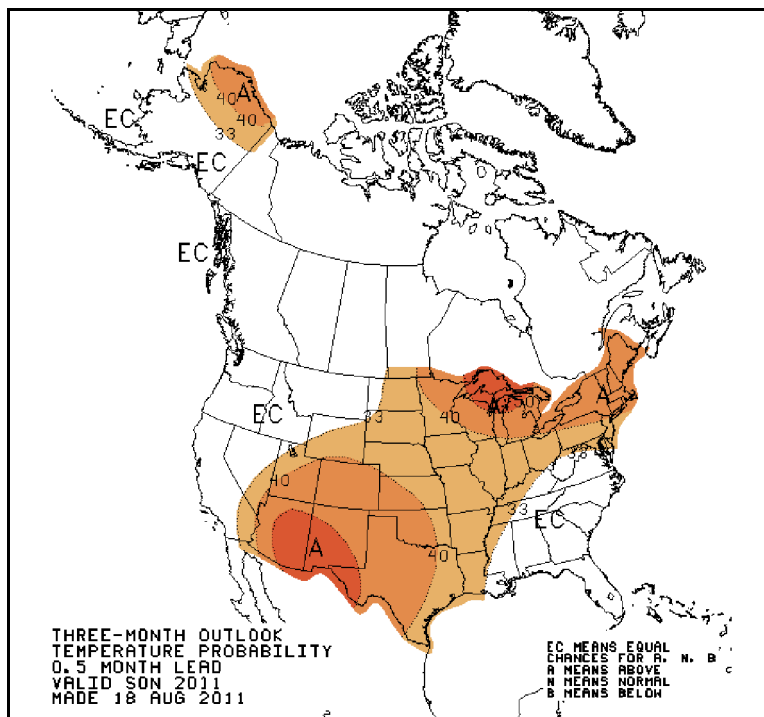
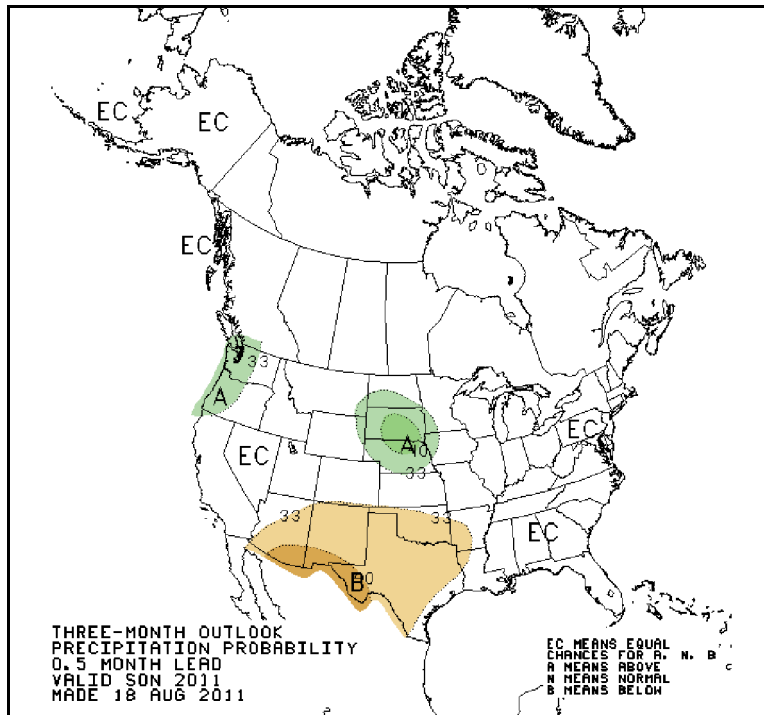


Figure 2. Precipitation (top) and temperature (bottom) forecasts for the period 1 September through 30 November 2011. Forecasting models indicate a bias toward below normal precipitation in areas shaded in brown and above normal temperatures in areas shaded in brown/red. Source: NOAA Climate Prediction Center

Location	Flower Date													
	Aug 12		Aug 19		Aug 26		Sep 2		Sep 9		Sep 16		Sep 23	
	Mature	Open	Mature	Open	Mature	Open	Mature	Open	Mature	Open	Mature	Open	Mature	Open
Aguila	Sep 5	Sep 24	Sep 13	Oct 3	Sep 21	Oct 13	Sep 30	Oct 28	Oct 10	Nov 19	Oct 20	NA	Nov 4	NA
Buckeye	Sep 3	Sep 18	Sep 10	Sep 27	Sep 18	Oct 6	Sep 26	Oct 17	Oct 5	Oct 30	Oct 15	Nov 16	Oct 26	Dec 19
Coolidge	Sep 5	Sep 23	Sep 12	Oct 1	Sep 21	Oct 11	Sep 29	Oct 24	Oct 8	Nov 8	Oct 19	Dec 2	Oct 30	NA
Harquahala	Sep 3	Sep 20	Sep 11	Sep 29	Sep 19	Oct 9	Sep 28	Oct 22	Oct 7	Nov 7	Oct 18	Dec 2	Oct 31	NA
Marana	Sep 5	Sep 22	Sep 12	Sep 30	Sep 21	Oct 11	Sep 28	Oct 20	Oct 7	Nov 4	Oct 16	Nov 22	Oct 28	Dec 30
Maricopa	Sep 4	Sep 20	Sep 11	Sep 29	Sep 19	Oct 8	Sep 27	Oct 19	Oct 6	Nov 3	Oct 16	Nov 23	Oct 27	NA
Mohave Val.	Sep 4	Sep 21	Sep 12	Oct 1	Sep 20	Oct 11	Sep 29	Oct 24	Oct 8	Nov 9	Oct 19	Dec 9	Oct 31	NA
Paloma	Sep 3	Sep 19	Sep 11	Sep 28	Sep 19	Oct 7	Sep 27	Oct 18	Oct 5	Oct 31	Oct 15	Nov 19	Oct 26	Dec 24
Parker	Sep 2	Sep 20	Sep 11	Sep 28	Sep 19	Oct 7	Sep 27	Oct 18	Oct 6	Oct 30	Oct 15	Nov 16	Oct 25	Dec 16
Queen Ck.	Sep 4	Sep 21	Sep 12	Sep 30	Sep 21	Oct 11	Sep 29	Oct 23	Oct 8	Nov 7	Oct 18	Nov 24	Oct 29	NA
Roll	Sep 3	Sep 18	Sep 10	Sep 27	Sep 18	Oct 5	Sep 26	Oct 16	Oct 4	Oct 28	Oct 14	Nov 14	Oct 25	Dec 18
Safford	Sep 8	Sep 29	Sep 16	Oct 10	Sep 25	Oct 23	Oct 4	Nov 11	Oct 15	NA	Oct 28	NA	Nov 11	NA
Yuma Val.	Sep 2	Sep 17	Sep 10	Sep 25	Sep 17	Oct 3	Sep 25	Oct 13	Oct 3	Oct 18	Oct 12	Nov 6	Oct 21	Nov 23

NA: Projected Boll Opening Date is After December 31.